

# CARBON MONOXIDE (CO)

## NATURE AND SOURCES

Carbon monoxide (CO) is a colorless and odorless gas formed when carbon in fuel is not burned completely. It is a component of on-road vehicle exhaust and other non-road engines and vehicles (such as aircraft, locomotives, and construction equipment). Higher concentrations of CO generally occur in areas with heavy traffic congestion. In cities, as much as 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metal processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. The highest levels of CO typically occur during the colder months of the year when inversion conditions (in which air pollutants are trapped near the ground beneath a layer of warm air) are more frequent.

## HEALTH EFFECTS

CO enters the bloodstream through the lungs and reduces oxygen delivery to the body's organs and other tissues. Higher levels of CO are most serious for those suffering from heart disease such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at high levels may cause chest pain and reduce the person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. People who breathe high levels of CO can develop vision problems, reduced ability to work, reduced manual dexterity, and difficulty performing complex tasks. At even higher levels, CO can cause death.

## TRENDS IN CO CONCENTRATIONS

Nationally, CO concentrations declined 62 percent between 1990 and 2006, as shown in Figure 25. In 2006, CO concentrations were the lowest in the past 17 years. One site in Birmingham, Ala., showed concentrations above 9 ppm, the level of the standard.

## TRENDS IN CO EMISSIONS

Nationally, CO emissions (excluding wildfires and prescribed burning) decreased 38 percent between 1990 and 2006, as shown in Figure 26. Emission reductions from transportation sources, a major contributor to ambient CO concentrations, were responsible for most of this decrease. CO emissions from transportation sources were reduced by more than 52 million tons (or about 40 percent) over the 17-year period.

These improvements in CO concentrations and emissions since 1990 occurred despite a 43 percent increase in vehicle miles traveled during the same 17-year period. Cleaner cars have contributed to cleaner air for much of the U.S.

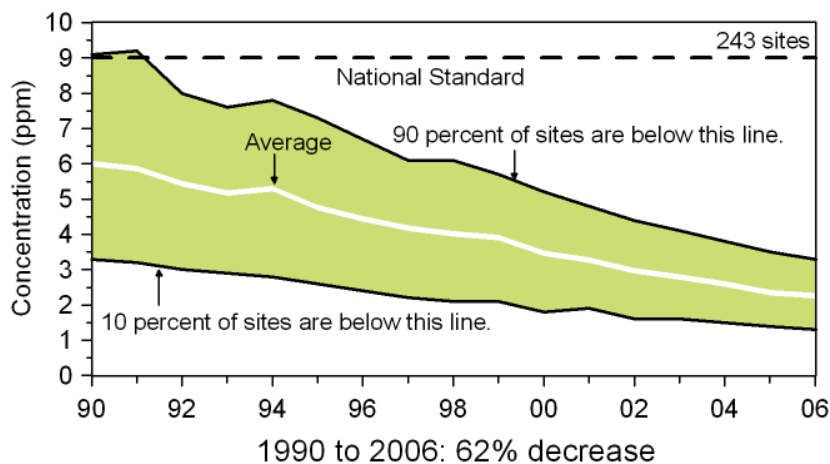


Figure 25. National CO air quality trend, 1990-2006 (second maximum 8-hour average).

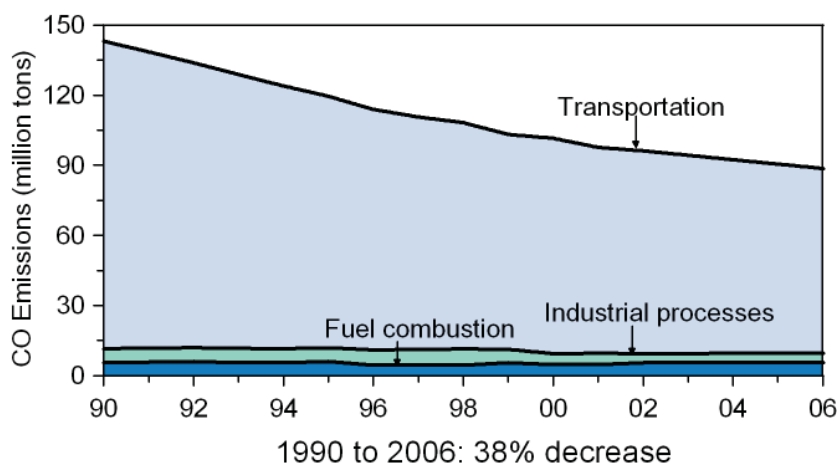


Figure 26. National trends in annual CO emissions, 1990-2006.